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September 29, 2021

U.S. Department of Transportation, Docket Operations
West Building Ground Floor, Room W12-140
1200 New Jersey Avenue, SE
Washington, DC 20590

Re: Petition for an Exemption to Conduct Unmanned Aircraft Systems (UAS) Operations Allowed by Special authority for certain unmanned aircraft systems. Title 49 U.S.C. § 44807, and 14 C.F.R. Part 11 to Authorize Commercial Agricultural- Related Services with UAS Weighing 55 Pounds or More

A. SUMMARY:

Kona Drone Service LLC is a newly established agricultural services company in Hawaii (hereafter known as KDS). Pursuant to Title 49 U.S.C. # 44807, Special authority for certain unmanned aircraft systems and 14 C.F.R. Part 11, KDS hereby respectfully requests expedited approval and necessary exemptions from the following listed Code of Federal Regulations ("CFR") for the purpose of operating the DJI AGRAS T-16 unmanned aircraft systems ("UAS") weighing 55 pounds or more but no more than 42 kilograms (92.59 lbs.) for pest control of Coffee Berry Borer, Coffee Leaf Rust, and other agriculture applications as appropriate in the coffee growing regions in Hawaii. The operations will be conducted within and under the conditions outlined herein, or as may be established by the FAA, as required by Title 49 U.S.C. § 44807.

The proposed operation in this Petition for Exemption is similar in nature to those conducted by Rocozo, LLC, Exemption No. 18599 utilizing the DJI AGRAS T-16 drone for agricultural aerial operations. The FAA decision and approval letter for the Rocoza, LLC Exemption is dated May 19, 2021.

As described more fully below in this particular petition, the requested exemption would permit the operation of no more than one DJI AGRAS T-16 by petitioner, under controlled conditions in predetermined airspace that is, 1) Limited in scope 2) Controlled as to access by mission essential personnel only. Grant of the requested exemption is based upon the concise direction expressed within Title 49 U.S.C. § 44807; the added authority granted by the Act, as amended; an equivalent level of safety regarding flight operations as expressed herein, and significant time and cost savings achieved by transitioning from ground applications to UASs. The petitioner respectfully requests that the FAA grant the requested exemption without delay. Petitioner will operate the DJI AGRAS T-16 while keeping the documents required by the regulations at the ground control station and immediately accessible to the Pilot in Command (PIC) and by modification of the required markings (registration number) of the UAS to be displayed on the fuselage.

The name and address of the Petitioner is:

Kona Drone Service LLC

75-5503 Mamalahoa Hwy
Holualoa, HI 96725

The primary contact for this petition, with a copy to me at the address above is:

Ray Anders

In support of this Petition for Exemption, KDS will submit the following associated UAS operating documents under separate cover:

- DJI AGRAS T-16 Operating Manual
- DJI 2600W 4-Channel Intelligent Battery Charger User guide
  - KDS Flight Operations and Procedures Manual
  - KDS Operational Risk and Safety Manual
  - KDS Maintenance Log/procedures

B. BACKGROUND OF PETITIONER AND MANUFACTURER

Kona Drone Service LLC is a newly established business that will conduct an agricultural aerial operation to provide a safer, more efficient, and more effective way to apply fungicides and other sprays that are now necessary to grow clean coffee crops in Hawaii. The PIC for KDS will be the owner/operator, Ray Anders. Ray is a coffee farmer with decades of experience growing fruit in Washington commercially

utilizing pesticides. He has a Bachelor of Science Degree in Forestry and his experience with aviation is extensive; Over 8000 accident-free hours, Naval Aviator, Standardization and Helicopter Instructor, Maintenance test pilot, Part 133 helicopter logging, construction, fire-fighting, and Part 137 helicopter spraying. He holds an AIRLINE TRANSPORT PILOT ROTORCRAFT-HELICOPTER certificate No. 1663934 with type ratings in BV107, SK64, and SK61. He has the required Remote Pilot Part 107 UAS license.

The initial focus for KDS is to provide a service of precision agriculture for aerial spray application to the Kona Coffee growing region on the Big Island of Hawaii. The benefits to the public and to the Hawaii coffee growers are 1) reduction in injury to ground based applicators in challenging terrain, 2) reduced exposure to chemicals for applicators, 3) improved timing and coverage of spray applications providing cleaner crops 4)addresses the labor shortage of available applicators and is a significant time saver over ground applications, 5)allows precision spot treatment of the crop reducing chemical usage, 6)the low noise level is environmentally friendly, 7) better value for the customer.

Commented [RA1]:

Commented [RA2R1]:

The UAS for the purposes of this petition is the DJI AGRAS T-16.

DJI has an unparalleled presence in the UAS market with steadfast commitment to R&D, a culture of constant innovation and curiosity, and a focus on transforming complex technology into easy-to-use devices. Building on the ethos of "form follows function," DJI products combine advanced technology with dynamic designs.

Established to produce DJI's innovative products safely and responsibly, the wholly owned subsidiary Shenzhen Dajiang Baiwang Technology Co., Ltd. is a high-tech manufacturing facility specializing in unmanned aerial vehicles.

In 2016, Dajiang Baiwang passed the ISO 9001:2015 Quality Management System Certification and in 2017 passed the SGS ISO 14001:2015 Environmental Management System Certification.

DJI's offices can now be found in the United States, Germany, the Netherlands, Japan, South Korea, Beijing, Shanghai, and Hong Kong. As a privately owned and operated company, DJI focuses on its vision, supporting creative, commercial, and nonprofit applications of their technology.

Today, DJI products are redefining industries. Professionals in filmmaking, agriculture, conservation, search and rescue, energy infrastructure, and more customers trust DJI to bring new perspectives to their work and help them accomplish feats safer, faster, and with greater efficiency than ever before.

The AGRAS T-16 continues to log hours adding to the millions of hours of testing and flight telemetry data. According to recent DJI distributor info, DJI sold 40,000 units of the T-16 and the next generation T-20 worldwide last year.

C. SYSTEM BENEFITS AND PUBLIC INTEREST

1. KDS's intent is to provide a focused precision agriculture aerial spray service to growers in the Kona Coffee growing regions on the Big Island of Hawaii. Some ten years ago the Coffee Berry Borer (CBB) was introduced to the Kona Coffee growing region on the Big Island and it has since spread to other islands. CBB attacks the coffee bean and will completely ruin a crop if not treated. The present best method for control of the beetle is to spray low toxic biological fungicide, early and at intervals of three weeks during the growing season. These sprays are applied by applicators with 65 lbs. back packs from the ground making it both hazardous to traverse the uneven terrain as well as exposing the applicators to the fungicide sprays.
2. Kona Coffee is one of the most important agriculture crops grown in Hawaii. The growing region includes more than 600 mostly small farms (2 to 10 acres) on the lee side of the Big Island. There are a few larger acreages but very little of the growing area can be farmed with traditional farm equipment. The DJI AGRAS T16 system is uniquely sized to optimize the use of aerial spray applications that will reduce labor costs, increase safety, provide timely applications, and improve crop quality and yields.
3. KDS will utilize the Phantom 4 RTK drone and DRTK base station to photograph farms and to plan flights for the T16 spray applications. It provides centimeter accuracy. The Phantom 4 RTK operation will be flown under Part 107. The T-16 will be flown autonomously from the individual farm with preplanned flight paths generated from the Phantom 4 RTK photos and DJI Terra software. Farm acreage, obstacles, pattern spray height that minimizes spray drift, and spray calibration are all preplanned. The T16 does have the capability for manual control at any time if needed along with Return to Home (RTH) capability.
4. As an example of the benefit of aerial application over ground application a comparison of actual times with attendant costs can be made. It takes four men with 65 lbs. back pack sprayers, eight to nine hours each to spray twenty acres. Experience has shown that spray coverage by the ground applicators is not always uniform and the fungicide coverage may be inconsistent. Cost for the four man eight-hour day at $20 per hour totals $640. A preplanned AGRAS T16 spray application will give uniform coverage to the twenty acres in slightly less than an hour. It will be done safely, with consistent coverage, and with no spray exposure to applicators.
5. This is a clear benefit to the public economy as well as to farmers and the coffee growing industry. There will be other needs for efficient aerial applications in the future. Two recently identified new pests are poised to do damage to Hawaii agriculture. Coffee Leaf Rust has been recently identified in Hawaii. If not controlled it will kill the coffee tree. The two-lined spittlebug has been recently identified. It is devastating grass pasture lands for cattle. Precision aerial application may be a welcome tool for their control.

D. DESCRIPTION OF THE AGRAS T-16 UAS

This description of the DJI AGRAS T-16 is nearly identical to the one submitted in the Petition No. 18599 submitted by Rocoza, LLC.

The AGRAS T16 has an improved overall structure with modular design and supports the highest payload and widest spray width ever in a DJI agricultural drone. With powerful hardware, an AI engine, and 3D-operation planning, the T16 brings operation efficiency to a whole new level.

Ease of use and construction - The all-new modular design of the T16 simplifies assembly and accelerates daily maintenance. An IP67 rating provides reliable protection for key components of the drone. A light, yet durable airframe is made of carbon fiber composites and can be quickly folded to 25% of its original size, making it easy for transportation. Both the battery and spray tank are easily swappable, significantly improving the efficiency of power and liquid supply.

Spraying Efficiency - Supported by its outstanding flight performance, the T16 spray tank can carry up to 16 L, and the spray width has increased to 6.5 m. The spraying system has 4 delivery pumps and 8 sprinklers with a maximum spray rate of 4.8 L/min. The T16 can spray 24.7 acres (10 hectares) [1] per hour. The spraying system also has an all-new electromagnetic flow meter, providing higher precision and stability than conventional flow meters.

Signal Redundancies - The all-new modular aerial-electronics system in the T16 has dual IMUs and barometers and adopts a propulsion signal redundancy design to ensure flight safety. The GNSS+RTK dual-redundancy system supports centimeter-level positioning. It also supports dual-antenna technology that provides strong resistance against magnetic interference.

Onboard Radar - The T16's upgraded radar system can sense the operating environment during the day or at night, without being affected by light or dust. It has greatly improved flight safety with forward and backward obstacle avoidance and a horizontal FOV (field of view) of 100°, double that of previous DJI agricultural drones. It can also detect the angle of a slope and adjust to it automatically even in mountainous terrain. This innovative radar system adopts Digital Beam Forming (DBF) technology, which supports 3D point cloud imaging that effectively senses the environment and helps to circumvent obstacles.

Multiple Aircraft Capability - Numerous companies are currently operating the AGRAS T-16 throughout the United States due to its flexibility and efficiency. The T16 provides different modes for flat ground, mountains, and orchards, to meet most operational needs. Up to five T16 aircraft can be controlled by a single T16 remote controller simultaneously. For purposes of this petition the consideration is one PIC, one T16.

Specifications:

Airframe	
Max Diagonal Wheelbase	1883 mm
Dimensions	2509×2213×732 mm (Arms and propellers unfolded) 1795×1510×732 mm (Arms unfolded and propellers folded) 1100×570×732 mm (Arms and propellers folded)
Propulsion System	
Motor	
Stator Size	100×15 mm

KV	75 rpm/V
Max Thrust	13.5 kg/rotor
Max Power	2400 W/rotor
Weight	616 g
Spraying System	
Spray Tank	
Volume	Rated: 15.1 L, Full: 16 L
Operating Payload	Rated: 15.1 kg, Full: 16 kg
Nozzles	
Model	XR11001VS (Standard), XR110015VS (Optional, purchase separately)
Quantity	8
Max Spray Rate	XR11001VS: 3.6 L/min, XR110015VS: 4.8 L/min
Spray Width	4-6.5 m (8 nozzles, at a height of 1.5 - 3 m above crops)
Droplet Size	XR11001VS: 130 - 250 μm, XR110015VS: 170 - 265 μm (Subject to operating environment and spray rate)
Total Weight (Excluding battery)	19.8 kg
Standard Takeoff Weight	41 kg
Max Takeoff Weight	42 kg (At sea level)
Max Thrust-Weight Ratio	1.975 (Takeoff weight of 41 kg)
Battery	DJI-approved battery pack (AB2-17500mAh-51.8V)

2600W 4 Channel Intelligent Battery Charger

Up to four batteries can be charged simultaneously. When using the single-channel quick charging mode, a full charge only takes 20 minutes, a 50% increase in speed from the previous generation. The charger has a built-in battery health management system that monitors critical data in real time, such as voltage and temperature, to ensure charging safety.

T 16 Intelligent Flight Battery

The T16 Intelligent Flight Battery has a capacity of 17,500 mAh and a 14S high voltage system that reduces power consumption. It is designed with an IP54-rated all-metal housing, and heat dissipation efficiency has increased by 140% from the previous generation. Supported by cell-balancing technology, the battery has an increased charging cycle of up to 400, 100% higher than the previous generation, significantly reducing operating costs.

E. Standard Components and Safety Systems

The T16 has an aerial-electronics system with a multiple redundancy design, and also has onboard D-RTK antennas, supporting dual-antenna technology that provides strong resistance against magnetic interference to ensure flight safety. Thanks to the dedicated DJI industrial flight control system, the T16 offers four operation modes: Route, A-B Route, Manual, and Manual Plus. DJI MG2 automatically produces flight routes based on your planned fields. To start, simply select the field from the field list. Plan a field by walking with the remote controller, an RTK handheld mapping device, or by flying the aircraft to waypoints, according to the application scenarios. In scenarios with complicated

terrain, use the PHANTOMTM 4 RTK and DJI Terra to plan 3D flight routes, and import the routes to DJI MG2 for operation.

In A-B Route operation mode, the aircraft travels along a planned route and sprays its liquid payload. Users can set the line spacing, flying speed, and other parameters.

In Manual operation mode, users can start and stop spraying manually, and also adjust the spray rate.

In Manual Plus operation mode, the flight speed is restricted, and the heading is locked. Except for the heading, users can control the movement of the aircraft via the control sticks.

Press button C1 or C2 on the remote controller or the corresponding button in the app and the aircraft will fly one line spacing to the left or right. Note that this is the default function for button C1 and button C2. They are customizable in the app.

The T16 also includes the Operation Resumption function. When pausing the operation in Route or A B Route operation mode, Operation Resumption records a breakpoint for the aircraft. Users can resume from the breakpoint when continuing the operation.

The remote controller features Multi-Aircraft Control mode, which can be used to coordinate the operation of up to five aircraft simultaneously. Turn the aircraft control switch dial on the remote controller to switch control between different aircraft.

The DBF imaging radar works automatically in Route, A-B Route, and Manual Plus operation modes during both day and night, without being affected by light or dust.

Altitude detection and stabilization functions are available in forward, backward, and downward directions while Obstacle Avoidance is available in forward or backward direction according to the direction of flight.

The radar module can detect the angle of a slope and automatically adjust to maintain the same distance with the surface even in mountainous terrain. In Route and A-B Route operation modes, the radar can effectively sense obstacles and plan a flight route to actively circumvent obstacles. Note that this is disabled by default. Users can enable it in the app.

The upgraded spraying system includes eight sprinklers placed on both sides of the aircraft to provide evenly distributed spraying and coverage of the liquid payload, and an all-new electromagnetic flow meter for higher precision and stability than conventional flow meters.

The T16 uses a dedicated DJI industrial flight controller to provide multiple operation modes for various applications. The DBF imaging radar provides terrain following to guide the aircraft to maintain a constant distance above crops in specific operation modes and is capable to actively circumvent obstacles through Auto Bypass. Functions such as operation resumption, system data protection, empty tank warning, low battery level warning, and RTH are also available.

F. Flight Modes

P-mode (Positioning): The aircraft utilizes GNSS or the RTK module for positioning. When the GNSS signal is strong, the aircraft uses GNSS for positioning. When the RTK module is enabled and the differential data transmission is strong, it provides centimeter-level positioning. The aircraft reverts to A-mode when the GNSS signal is weak. The aircraft will fly in P-mode by default.

A-mode (Attitude): GNSS is not used for positioning and the aircraft can only maintain altitude using the barometer. The aircraft enters A-mode only when there is weak GNSS signal or when the compass experiences interference. The flight speed in A-mode depends on its surroundings such as the wind speed. In A-mode, the aircraft cannot position itself and is easily affected by its surroundings,

which may result in horizontal shifting. Use the remote controller to position the aircraft. Maneuvering the aircraft in A-mode can be difficult. Avoid flying in confined spaces or in areas where the GNSS signal is weak. Otherwise, the aircraft will enter A-mode, leading to potential flight risks. Land the aircraft in a safe place as soon as possible.

G. System Data Protection

In Route or Route A-B operation mode, the System Data Protection feature enables the aircraft to retain vital system data such as operation progress and breakpoints after the aircraft is powered off to replace a battery or refill the spray tank. Follow the instructions in Operation Resumption to resume the operation after restarting the aircraft.

During Route operations, in situations such as when the app crashes or the remote controller disconnects from the aircraft, the breakpoint will be recorded by the flight controller and can be recovered in the app once the aircraft is reconnected. Go to Operation View, select, then Advanced Settings, and tap Continue Unfinished Task. Recall the operation in Executing tag in operation list.

H. Obstacle Avoidance

Obstacle avoidance is used in the following two scenarios:

1. The aircraft begins to decelerate when it detects an obstacle is 15 m away and hovers in place when 2.5 m away from the obstacle. Users can not accelerate in the direction of the obstacle but can fly in a direction away from the obstacle.
2. The aircraft immediately brakes and hovers if it detects an obstacle nearby. Users cannot control the aircraft when it is braking.

When the aircraft is hovering, it is in Obstacle Avoidance mode. Users can fly in a direction away from the obstacle to exit Obstacle Avoidance mode and regain full control of the aircraft.

I. Return to Home (RTH)

There are two types of RTH: Smart RTH and Failsafe RTH.

Smart RTH

Press and hold the RTH button on the remote controller when GNSS is available to enable Smart RTH. Both Smart and Failsafe RTH use the same procedure. With Smart RTH, you may control the speed and altitude of the aircraft to avoid collisions when returning to the home point. The aircraft status indicators will show the current flight mode during RTH. Press the RTH button once or toggle the pause switch to exit Smart RTH and regain control of the aircraft.

Failsafe RTH

Failsafe RTH is automatically activated if the remote controller signal is lost for more than three seconds, provided that the home point has been successfully recorded, the GNSS signal is strong (the white GNSS icon), and the RTK module is able to measure the heading of the aircraft. The RTH continues if the remote controller signal is recovered, and users can control the aircraft using the remote controller.

Press the RTH button once or toggle the pause switch to cancel RTH and regain control of the aircraft.

There are two ways to set a home point:

1. Set the current coordinates of the aircraft as the home point.
2. Set the current coordinates of the remote controller as the home point.

Obstacle Avoidance During RTH

In an optimal operating environment, obstacle avoidance during RTH is available. If there is an obstacle Within 20 m of the aircraft, the aircraft decelerates and then stops and hovers. If the aircraft comes within 6 m of the obstacle while decelerating, the aircraft stops, flies backward to a distance of approximately 6m from the obstacle, and hovers. The aircraft exits the RTH procedure and waits for further commands.

Landing Protection Function

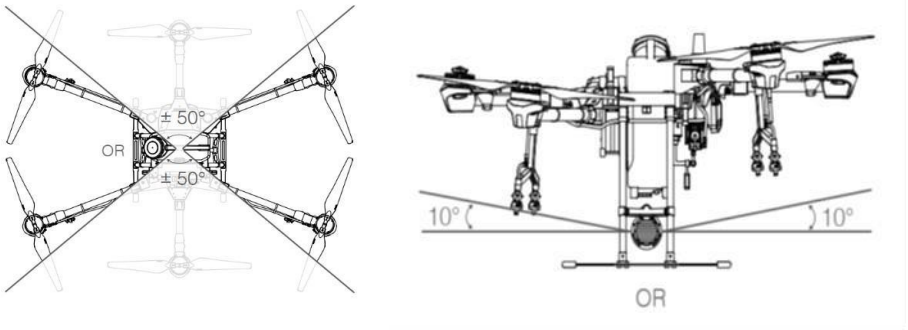
Landing Protection activates during auto landing.

J. DBF Imaging Radar

The all-new DBF imaging radar works during both day and night, without being affected by light or dust. In an optimal operating environment, the radar module can predict the distance between the aircraft and the vegetation or other surfaces in forward, rear, and downward directions to fly at a constant distance to ensure even spraying and terrain following capability. The DBF imaging radar can also detect obstacles 30 m away from the aircraft. The radar module adopts digital beam forming technology, which supports 3D point cloud imaging that effectively senses the environment and helps to circumvent obstacles in both Route and A-B Route operation modes. In addition, radar module limits the descent speed of the aircraft according to the distance between the aircraft and ground, to provide a smooth landing.

The altitude stabilization and obstacle avoidance functions of the radar module are enabled by default, and can be disabled in the app. When enabled, the aircraft flies above the vegetation at a constant spraying distance in Route, A-B Route, and Manual Plus operation modes. In Manual operation mode, the radar module can also measure the spraying distance above the vegetation or other surfaces, but the aircraft is not be able to fly at a constant spraying distance. The obstacle avoidance function can be used in any mode. Auto Bypass is disabled by default.

The horizontal detection range is ±50° and the vertical detection range is 0° to 10°, as shown below.



K. Low Voltage and Battery Warnings

The aircraft features a low battery warning, critical low battery warning, and critical low voltage warning.

1. Low Battery Warning: The aircraft status indicators slowly blink red. Fly the aircraft to a safe area and land it as soon as possible, stop the motors, and replace the batteries.
2. Critical Battery Warning or Critical Voltage Warning (the battery voltage is lower than 47.6 V): the aircraft status indicators rapidly blink red. The aircraft begins to descend and land automatically.

L. Flight Limits and Geofencing Zones

For safety reasons, flight limits are enabled by default to help users operate this aircraft safely and legally. Users can set flight limits on height and distance.

When operating with a strong GNSS signal, the height and distance limits and GEO Zones work together to monitor flight. With a weak GNSS signal, only the height limit prevents the aircraft from going above 30 meters.

GEO Zones are divided into different categories. All GEO Zones are listed on the DJI official website at http://www.dji.com/flysafe.

Flight Recording of all flights: Flight data shows a real-time video of all operator control input, GPS statuses, vibrate, shake and motor balance statuses along with battery voltage and all other critical telemetry data allowing operator to fully track entire history. All flights are automatically saved on the GCS. This further adds to safety for operator and VO training as operator-caused issues can be quickly identified.

High Visibility LED Aviation Lighting: The AGRAS T-16 has Long-range visible, high intensity LED strobes.

M. REGULATORY BASIS FOR PETITION AND REGULATIONS FROM WHICH EXEMPTION IS SOUGHT

1. 49 U.S.C § 44807

The Special Authority for Certain Unmanned Systems (49 U.S.C. § 44807) grants the Secretary of Transportation the authority to use a risk-based approach to determine whether an airworthiness certificate is required for a drone to operate safely in the NAS. Under this authority, the Secretary may grant exemptions to the applicable operating rules, aircraft requirements, and pilot requirements for a specific operation on a case-by-case basis. The Special Authority for Certain Unmanned Systems (49 U.S.C. § 44807) grants UAS operators safe and legal entry into the NAS upon consideration of its size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line of sight. The FAA further may find that the UAS does not require "airworthiness certification under section 44704 of title 49, United States Code."

2. 49 U.S.C. § 44701

The FAA is further authorized to grant exemptions from its safety regulations and minimum standards under 49 U.S.C. § 44701 ("Section 44701") "if the Administrator finds the exemption

is in the public interest." Section 44701(f) (authorizing the grant of exemptions from safety regulations and minimum standards under Section 44701(a) and (b) and Sections 44702-44716). Under 49 U.S.C. § 44701(f), the "Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any of sections 44702-44716 of [Title 49] if the Administrator finds the exemption is in the public interest."

For the reasons addressed herein, this Petition qualifies for expedited approval of Petitioner's request for exemption under both 49 U.S.C § 44807 and 49 U.S.C § 44701.

KDS seeks exemption from the following interrelated provisions of 14 C.F.R. Parts 61, 91, and 137:

FAR	Description
§ 61.3 (a)(1)(i)	**Requirement for certificates, ratings, and authorizations.**
§ 91.7(a)	**Civil aircraft airworthiness.**
§ 91.119(c)	**Minimum safe altitudes: General.**
§ 91.121	**Altimeter settings.**
§ 91.151(b)	**Fuel requirements for flight in VFR conditions.**
§ 91.405(a)	**Maintenance required.**
§ 91.407(a)(1)	**Operation after maintenance, preventive maintenance, rebuilding, and inspections.**
§ 91.409(a)(1) and (2)	**Inspections.**
§ 91.417(a) and (b)	**Maintenance records.**

§ 137.19 (c), (d) and (e)(2)(ii)(iii) and (v)	**Certification requirements.**
§ 137.31	**Aircraft requirements.**
§ 137.33	**Carrying of certificate.**
§ 137.41(c)	**Personnel, Pilot in command.**
§ 137.42	**Fastening of safety belts and shoulder Harnesses**

Listed below are the specific Code of Federal Regulation ("CFR") sections from which an exemption is sought, the rationale for why an exemption is needed, and a brief summary of the operating procedures and safeguards, which are described more fully in the operating documents being submitted under separate cover, which will ensure that the proposed operations can be conducted at a level of safety that is at least equal to that provided by the rule from which exemption is sought. For ease of review, this section divides the FARs from which exemption is sought into four main categories: (1) FARs pertaining to the UAS; (2) FARs pertaining to UAS Operating Parameters, and; (3) FARs pertaining to Part 137 Operating Parameters.

I. FARs Pertaining to the Unmanned Aircraft System

§ 91.405(a) *Maintenance required* § 91.407(a)(1) *Operation after maintenance, preventive maintenance, rebuilding, or alteration* § 91.409(a)(1) and (2) *Inspections* § 91.417(a) and (b) *Maintenance records*

KDS seeks an exemption from the following maintenance and inspection related FARs: §§ 91.405(a) *Maintenance required*, 91.407(a)(1) *Operation after maintenance, preventive maintenance, rebuilding, or alteration*, 91.409(a)(1) and (2) *Inspections*, and 91.417(a) and (b) *Maintenance records*. These regulations specify maintenance, inspection, and records standards in reference to FAR § 43.6. An exemption from these regulations is needed because Part 43 and these sections only apply to aircraft with an airworthiness certificate, which the UAS to be operated under this exemption will not have, and because compliance with these regulatory provisions in the context of UAS operations is not feasible.

An equivalent level of safety will be achieved because maintenance, inspections, and records handling will be performed in accordance with the manufacturer's manual, any required manufacturer safety or service bulletins. Moreover, the PIC will conduct a pre-flight inspection of the UAS and all associated equipment to account for all discrepancies and/or inoperable components. Maintenance will be performed and verified to address any conditions potentially affecting the safe operation of the UAS, and no flights will occur unless and until all flight critical components of the UAS have been found to be airworthy and in a condition for safe operation. A functional test flight will also be conducted in a controlled environment following the replacement of any flight critical components, and, as required by the operating documents, the PIC who conducts the functional test flight will make an entry in the UAS aircraft records of the flight. Functional flight tests will not involve the carriage of hazardous materials. In addition, the operator will be required to follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the UAS and its components. Along with the preflight checklists, KDS Pilot Experience, and a routine maintenance program, KDS believes an equivalent level of safety is met, and that equipment at risk of failure can be safely identified before flights occur.

II. FARs Pertaining to Unmanned Aircraft System Operating Parameters *§ 91.7(a) Civil aircraft airworthiness*

Inasmuch as there will be no airworthiness certificate issued for the UAS, KDS seeks an exemption from FAR § 91.7(a) *Civil aircraft airworthiness*, which requires that a civil aircraft be in an airworthy condition to be operated. While the UAS operated by KDS will not have an airworthiness certificate, consistent with the FAA's determination in the Branch Enterprises Exemption, the pilot may determine the UA is in an airworthy condition prior to flight. As described more fully in the operating documents, this is achieved through adherence to the KDS routine pre-flight checklist and adherence to the manufacturer's recommendations.

§ 91.119(c) Minimum safe altitudes

KDS also seeks an exemption from FAR § 91.119(c) *Minimum safe altitudes*, to the extent necessary to allow UAS operations over *other than congested areas* at altitudes lower than those permitted by rule. The ability to operate at those altitudes is one of the key benefits of using UAS

for the proposed agricultural activities. An equivalent or greater level of safety will be achieved given the size, relatively light weight, and slow speed of the UAS, as well as the controlled location in rural farm land where the operations will occur.

KDS generally will try to maintain an operating altitude of between 10-25 feet AGL during its spraying operations. That altitude is only increased when exercising caution and issuing a return to home (RTH) command to the UAS, which causes the UAS to ascend to a pre-assigned altitude of 100 feet AGL or less before returning home. This operation will occur in a rural farmland environment adhering to VLOS and utilizing properly briefed VOs. Even at these low altitudes, KDS UAS operations will be conducted at a level of safety equal to or greater than that achieved by a larger manned aircraft performing similar activities at the altitudes required by FAR § 91.119.

§ 91.121 Altimeter settings

KDS also requests an exemption from FAR § 91.121 *Altimeter settings,* which requires a person operating an aircraft to maintain cruising altitude or flight level by reference to an altimeter that is set to the elevation of the departure airport or barometric pressure. In the Branch Enterprises Exemption, the FAA stated that an equivalent level of safety to the requirements of FAR § 91.121 can be achieved in circumstances where the PIC uses an alternative means for measuring and reporting UA altitude, such as global positioning system (GPS). The Agras T16 utilizes both GPS and radar for altitude control. Consistent with previously granted exemptions, these requirements ensure that an equivalent level of safety will be achieved, and an exemption from the requirements of FAR § 91.121 is therefore appropriate.

§ 91.151(b), Fuel requirements for flight in VFR conditions

Finally, KDS seeks an exemption from FAR § 91.151(b) *Fuel requirements for flight in VFR conditions,* which would otherwise require a 20-minute fuel reserve to be maintained. The FAA has previously determined that a requirement prohibiting the PIC from beginning a UAS flight unless (considering wind and forecast weather conditions) there was enough available power for UAS to operate for the intended operational time and to operate after that with the reserve power recommended by the manufacturer which would ensure an equivalent level of safety to the fuel requirements of FAR § 91.151. KDS will adhere to the manufacturer's reserve power requirement and an exemption from FAR § 91.151's fuel requirements for flight in VFR conditions is therefore appropriate.

III. FARs Pertaining to Part 137 Certification Requirements

KDS seeks an exemption from the following FARs in Part 137: §§ 137.19(c), (d) and (e)(2)(ii)(iii) and (v) *Certification requirements*, 137.31 *Aircraft requirements*, 137.33 *Carrying of certificate*, 137.41(c) *Personnel*, and 137.42 *Fastening of safety belts and shoulder harnesses*. An exemption from these FARs is necessary because the provisions are either not compatible with or are unnecessary in the context of the proposed UAS operations.

§ 137.19(c) Certification requirements

In the previous exemption granted to Branch Enterprises, the FAA determined that relief from § 137.19(c) was necessary to permit persons holding a remote PIC certificate with small UAS rating to act as PIC for commercial agricultural aircraft operations when utilizing a small UAS to conduct the operations. The FAA found that a commercial or airline transport certificate that §

137.19(c) requires was not a reasonable requirement for the UAS agricultural operations proposed by Branch Enterprises. The basis for the relief was that Branch Enterprises remote PICs would comply not only with the requirements of Part 107, sub part C, but also with the additional knowledge and applicable skill requirements in FAR § 137.19(e)(1) and (2)(i), (iv) and (vi).

The proposed operations are identical to that previously approved by the FAA in Exemption No.18579. The PIC for KDS meets the requirements of Part 137.19(c) with its implied level of safety. KDS agrees that an equivalent level of safety can be achieved without the FAR § 137.19(e)(1) and (2)(i), (iv) and (vi). Approval of this exemption is consistent with the FAA's prior analysis.

§ 137.19(d) Certification requirements § 137.31 Aircraft requirements

In Exemption No. 18579, the FAA granted Branch Enterprises an exemption to §§ 137.19(d), *Certification requirements,* and 137.31(a), *Aircraft requirements.* Consistent with the FAA's prior analysis in Exemption No. 18579, while KDS UAS will not have an airworthiness certificate, KDS will be capable of ensuring that the UAS are in a condition for safe operation based upon a thorough pre-flight inspection and compliance with the operating documents. The UAS components have a proven operational history and contain design safety features such that operations conducted under the requirements of this exemption will not adversely impact safety.

§ 137.19(e)(2)(ii), (iii), and (v) Certification requirements

KDS seeks an exemption from the knowledge and skill test requirements in § 137.19(e)(2)(ii), (iii), and (v) *Certification requirements,* because those requirements are not compatible or applicable to KDS proposed UAS operations. Consistent with the FAA's prior analysis in Exemption No. 18579, KDS training and certification program described in the operating documents provides the remote PIC with the necessary skills to safely operate the UAS. For this reason, granting relief from a demonstration of the skills described in § 137.19(e)(2)(ii), (iii), and (v) and the interrelated 137.41c will not adversely impact safety, and therefore relief is warranted. KDS pilot operating UAS under the exemption will still be required to demonstrate the skills listed at § 137.19(e)(2) as applicable, in accordance with the provisions of § 137.19(e), which requires such demonstration in order to obtain the agricultural aircraft operator certificate, unless otherwise exempted.

§ 137.31(b) Aircraft requirements § 137.42 Fastening of safety belts and shoulder harnesses

KDS seeks an exemption from § 137.31(b) *Aircraft requirements,* and § 137.42 *Fastening of safety belts and shoulder harnesses,* which relate to the installation and use of a shoulder harness and safety belt on an aircraft. An exemption from these requirements is warranted because KDS UAS do not have an onboard pilot and these regulations are intended to ensure the safety of the onboard pilot during manned agricultural aircraft operations. For this reason, granting the requested relief from §§ 137.31(b) and 137.42 will not adversely impact safety.

§ 137.33(a) and (b) Carrying of certificate

KDS requests relief from § 137.33(a) *Carrying of certificate*, which requires that a facsimile of the agricultural aircraft operator certificate be carried on the aircraft. The FAA has previously determined that relief from §§ 91.9(b)(2) and 91.203(a) and (b) for the carriage of the aircraft flight manual and aircraft registration onboard the aircraft is not necessary. Consistent with the FAA's

prior analysis, an exemption is warranted here provided that a facsimile of the agricultural aircraft operator certificate and all certificates of registration are kept in a location accessible to the remote PIC.

Finally, given that KDS UAS will not have an airworthiness certificate, relief from § 137.33(b) *Carrying of certificate,* which requires the airworthiness certificate (if not carried in the aircraft) be kept available for inspection at the base of dispensing operation is conducted, is necessary. KDS will keep registration certificates available for inspection.

KDS has attempted to identify the appropriate C.F.R.s from which an exemption is needed in order to conduct the proposed operations in this Petition for Exemption. To the extent that the FAA determines that KDS needs an exemption from other C.F.R.s which are not addressed or explicitly named in order to conduct the proposed operations, KDS also seeks an exemption from those FARs for the reasons outlined above.

N. PILOT CERTIFICATION

§ 61.3 (a)(1)(i) Requirement for certificates, ratings, and authorizations.

No person may serve as a required pilot flight crew member of a civil aircraft of the United States unless that person:

(1) has in the person's physical possession or readily accessible in the aircraft when exercising the privileges of that pilot certificate or authorization –

(i) a pilot certificate issued under this part.

The petitioner will conduct the proposed operations under 14 CFR part 91, rather than under part 107. In general, part 91 is predicated on the presumption that the pilot in command conducting an operation under part 91 holds an airman certificate under part 61. As a result, the FAA has determined granting exemption from the requirement of § 61.3(a)(1)(i) to require a person holding a remote pilot in command certificate (with the appropriate training and demonstration of knowledge and skills required by this exemption) to conduct the operations to which this exemption applies will ensure clarity.

The statutory obligation for an airman certificate is codified at 49 U.S.C. § 44711(a)(2). Pilots who conduct operations under this exemption with a remote pilot in command certificate would comply with § 44711(a)(2), as the FAA described in the Operation and Certification of Small Unmanned Aircraft Systems final rule (81 FR 42064, 42088-89 (June 28, 2016). The general requirements for all airmen include: eligibility, aeronautical knowledge and Transportation Security Administration (TSA) vetting. Given that the operation would occur only after airmen who hold a current remote pilot in command certificate have received specific training, have visited the area of operation and are fully capable of using the tools available to prepare for the operation, conduct comprehensive preflight actions, and conduct the operation only in a limited geographical area, the FAA has previously determined that a remote pilot certificate issued under 14 CFR part 107 provides the FAA sufficient assurance of the pilots' qualifications and abilities to perform the duties related to the operations authorized under this exemption. The remote pilot in command certificate confirms the petitioner's eligibility, secures TSA vetting, and ensures the PIC has the requisite aeronautical knowledge for operating the UAS within the NAS.

Remote pilots conducting operations under part 107 must complete a detailed aeronautical knowledge test, unless they already hold a certificate under 14 CFR part 61 and meet the flight review requirements specified in § 61.56.9 As a result, all such pilots will have the requisite aeronautical knowledge that is a key component of safe completion of all operations that will occur under this exemption. In this regard, the FAA addressed the applicable parts of § 61.125, Aeronautical knowledge, in the remote pilot in command certificate requirements.

For the reasons discussed below, this same rationale espoused by the FAA in previous approved exemptions, combined with KDS proposed safety mitigations, also supports a finding that the proposed operations under the requested exemptions can be conducted without adversely affecting safety.

While it is true that operations involving UAS weighing 55 pounds or more could raise additional safety concerns than operations involving small UAS, the unique nature of the proposed operations, including the low-risk rural environments in which the operations will occur, will ensure that safety is not jeopardized. While Part 107 will not apply to the proposed operations, wherever possible, KDS intends to conduct the proposed operations in accordance with Part 107. Moreover, all UAS operations that meet the definition of an "Agricultural aircraft operation" will be conducted in accordance with those portions of Part 137 from which KDS is not exempted. In addition to compliance with Part 107 and the applicable sections of Part 137, KDS proposed operations include the following mitigations, however, a full SRM regarding certain elements of the operation is also included:

- Prior to any flight operation, KDS will visit the area of planned operation and inspect the terrain and vantage points. KDS utilizes the DJI Phantom 4 RTK drone and DRTK base station to photograph and plan flights for the Agras T16.
- Safety procedures and mitigations of the UAS operation are contained within the safety section of the Flight Operations and Procedures Manual.
- Following that, all state and local paperwork associated with the operation will be filed before and after operations. KDS will comply with all state laws regarding the application of pesticides. These include state and local agency notification, mapping, and specified safety procedures.
- The PIC will hold a Part 107 remote pilot airman certificate and be at least 18 years of age.
- Prior to beginning operations, the PIC will take all preflight actions as set forth in the T-16 flight manual, which includes a comprehensive preflight checklist.
- At least one visual observer (VO) will be used for each aircraft during all operations. Both the PIC and VO will maintain a safe distance from the UAS when it is operating as set forth in its flight manual.
- Flights will be limited to a maximum altitude of no more than 200 feet above ground level (AGL) and will normally be flown at average altitudes of 10 to 50 feet AGL or less over private fields and other agricultural areas.
- The areas to be flown are remote agricultural sites or other uninhabited agricultural sites which makes for excellent VLOS conditions.
- All operations will occur in a closed-access environment.

- All personnel at the site will be controlled by KDS at the time of flying. The AGRAS T-16 shall operate from on-site takeoff/landing locations directly next to the PIC and co-located VO. The PIC and the VO will be able to verbally communicate during all operations or will utilize hand-held radios on site. In addition, signage announcing future spraying operations will be posted at the site entrance warning any customer employees or non-Participants that an aerial spraying operation is occurring. This is an industry standard process.
- The maximum flight time for each UAS flight will be a maximum of 40 minutes, with most agricultural flights lasting approximately 10-20 minutes.

I. KDS's Enhanced Pilot Training and Experience Standards

The PIC for KDS is the owner/operator whose aeronautical experience exceeds that required for a commercial helicopter rating under part 61.127(c). The PIC has traveled to California for a weekend of intensive training with the DJI engineer on both the Phantom 4 RTK and the Agras T-16 drones. DJI training was included as part of the purchase of the DJI Agras T-16 agriculture drone package. A DJI engineer will visit Hawaii and spend two or more days of training on site on selected coffee farms. This will be important training to establish the best and safest operating procedures specific to aerial spraying coffee farms in Kona. This operational training will be documented and incorporated into the KDS operating procedures manual. All training will be conducted on a non-revenue basis.

Aeronautical Knowledge

The following chart addresses each aeronautical knowledge requirement of § 61.125 and explains whether it is relevant to, different from, or addressed by Part 107 operations or KDS internal procedures.

§ 61.125, Aeronautical Knowledge	**KDS Operations Under Part 107**
(1) Applicable Federal Aviation Regulations of this chapter that relate to commercial pilot privileges, limitations, and flight operations;	Addressed by Part 107
(2) Accident Reporting	Addressed by Part 107
(3) Basic aerodynamics and the principles of flight	Topics applicable to unmanned aircraft are included in Part 107.
(4) Meteorology	Applicable meteorology principles are covered by Part 107.
(5) Safe and Efficient Operation of Aircraft	Covered by Part 107 and included in KDS training. Topics applicable to unmanned aircraft are included in Part 107.
(6) Weight and Balance	"Loading and Performance" is addressed by art 107. KDS will comply with the weight limitations of Part 107 and will ensure that external loads do not negatively impact flight characteristics, as required by Part 107.

(7) Performance Charts	Not directly applicable.
(8) Effects of exceeding aircraft performance limitations	"Loading and Performance" is addressed by art 107. KDS- will comply with the weight limitations of Part 107 and will ensure that external loads do not negatively impact flight characteristics, as required by Part 107.
(9) Pilotage and dead reckoning	Not applicable.
(10) Use of air navigation facilities	Topics applicable to unmanned aircraft are included in Part 107.
(11) Decision making and judgment	Covered by Part 10.7
(12) Principles and functions aircraft systems	Covered by Part 107 and by Rocoza internal procedures and use of operations manuals.
(13) Emergency operations	Covered by Part 107.
(14) Night and high altitude	Not applicable.
(15) Operating within the national airspace system	Covered by Part 107.
(16) Lighter than air ratings	Not Applicable.

Flight Proficiency

FAR § 61.127 contains flight proficiency requirements for specified aircraft categories. Part 107 contains no flight proficiency requirements. The PIC for KDS has met all of the flight proficiency requirements listed for rotorcraft in FAR 61.127. The requirements include:

- Preflight preparation;
- Preflight procedures;
- Airport and heliport operations;
- Hovering maneuvers;
- Takeoffs, landings, and go-arounds;
- Performance maneuvers;
- Navigation;
- Emergency operations;
- Special operations; and
- Postflight procedures.

Aeronautical Experience

FAR § 61.129 contains requirements for aeronautical experience that are not required for operations conducted under Part 107. The PIC for KDS exceeds the requirements listed in FAR Part 61.129 holding an ATP Rotorcraft-Helicopter certificate with commercial privileges. DJI training was included as part of the purchase of the Agras T-16 agriculture drone package. In addition to the training experience provided by the DJI engineer visit to Hawaii, the PIC for KDS will log 10 hours of T-16 pilot time before any commercial operation is conducted.

O. Conditions and Limitations

KDS agrees to conduct the proposed operations in accordance with the same applicable conditions and limitations ("Limitations") included in the previous Branch Enterprises Exemption No. 18579.

P. FEDERAL REGISTER SUMMARY

Pursuant to Title 49 U.S.C. § 44807, Special authority for certain unmanned aircraft systems and 14 C.F.R. Part 11, 49 U.S.C. § 44701(f), and 14 C.F.R. Part 11, the following summary is provided for publication in the FEDERAL REGISTER, should it be determined that publication is needed:

Petitioner seeks an exemption from the following rules in Title 14 of the Code of Federal Regulations:

61.3 (a)(1)(i), 91.7(a), 91.119(c), 91.121, 91.151(b), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), 91.417(a) and (b), 137.19 (c), (d) and (e)(2)(ii)(iii) and (v), 137.31, 137.33, 137.41(c), 137.42.

KDS requests an exemption for the purpose of operating Unmanned Aircraft Systems (UAS) weighing 55 pounds or more, but no more than and 97.57 pounds, to provide commercial agricultural-related services in the United States. The relief requested is similar to that granted in Exemption No. 18599, Rocoza, LLC, with Decision letter dated, May 19, 2021.

Q. CONCLUSION

For the foregoing reasons, KDS respectfully requests that the FAA grant this Petition for Exemption. Should you have any questions, or if you need additional information to support KDS Petition, please do not hesitate to contact the undersigned.

Respectfully Submitted,

Ray Anders
CEO
Kona Drone Service LLC